REMARKS

The amendment to the drawings requested herein is for correcting informalities. Support for Figure 4 can be found on page 13, line 18, where it is started "under pressurization of 2.3 MPa." Support for Figure 6 can be found on page 16, lines 16-17, where it is started "under constant pressure pressurization (2.1 MPa)." Support for Figure 7 can be found on page 17, lines 6-7, where it is started "under constant pressure pressurization (2.1 MPa)." Additionally, drawing numbers have been changed to separately indicate each drawing. The amendment does not raise any new matter, and Approval of this amendment is respectfully requested.

Respectfully submitted,

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molten metal inside the sealed vessel to thereby obtain the porous metal body.

2. The process for producing a porous metal body according to item 1 above, wherein the metal is selected from the group consisting of iron, copper, nickel, cobalt, magnesium, **aluminium**, titanium, chromium, tungsten, manganese, molybdenum, beryllium, and alloys comprising one or more of these metals.

3. The process for producing a porous metal body according to item 1 above, wherein the reduced pressure in step (1) is 10^{-1} Torr or lower.

4. The process for producing a porous metal body according to item 3 above, wherein the reduced pressure in step (1) is between 10^{-1} and 10^{-6} Torr.

5. The process for producing a porous metal body according to item 1 above, wherein the metal material in step (1) is maintained at a temperature which is 50 to 200°C lower than the melting point of the metal.

6. The process for producing a porous metal body according to item 1 above, wherein the gas used in steps (2) and (3) is at least one member selected from the group consisting of hydrogen, nitrogen, argon and helium.

7. The process for producing a porous metal body according to item 1 above, wherein the pressure applied in step (2) is between 0.1 and 10 MPa.

IN THE DRAWINGS:

As stated in the attached Request for Approval of Drawing Changes, Applicant has requested to amend Figures 4, 6, 7, 14, 16 and 19 to correct informalities, as shown in the attached copy of the figures wherein the correction is indicated with red ink.

REMARKS

On page 4, line 23, "melted" was replaced with "dissolved." Support therefor can be found on page 12, lines 18-20, which describes that gas is dissolved in the metal. It is also clear from "gas-dissolving characteristics" in lines 20-21 on page 4. On page 5, line 11, "under the constant total pressure, 2.1 MPa" was inserted at the end of the sentence. Support therefor can be found on page 16, lines 16-19, wherein the same content is described. On page 5, line 16, "under the constant total pressure, 2.1 MPa" was inserted at the end of the sentence. Support therefor can be found on page 17, lines 6-8, wherein the same content is described. On page 6, lines 24-25, "ordinary steel" was replaced with "iron." Support therefor can be found on page 31, line 25 to page 32, line 1, which describes that Fig. 18 shows the porosity each of the four different porous iron cylinders (a) to (d) obtained. On page 7, line 1, "2.0 MPa" was inserted after "1.5MPa." Support therefor can be found in (b) and (d) of Fig. 18, wherein the total gas pressure of nitrogen and helium is 2.0 MPa (1.0 + 1.0 in (b) and 1.5 + 0.5 in (d)). On page 34, lines 18-19, one of the redundant phrases, "under a pressurizing gas atmosphere" was deleted. Additionally, drawing numbers have been amended to comply with the U.S. practice. The drawings also have been amended to correct informalities. As such, no new matter has been added. Attached hereto is a marked-up version of the changes made to the specification by the current amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE." Additionally, the cross-reference information has been included in the specification. Entry of the amendments is respectfully requested.

Should there be any questions concerning this application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Paragraph beginning at line 20 of page 4 has been amended as follows:

Fig. 3 is a conceptual diagram showing the gas-dissolving characteristics of the solid and liquid phases in the cooling and solidifying step of the molten metal in which gas has been ~~melted~~dissolved.

Paragraph beginning at line 7 of page 5 has been amended as follows:

Fig. 6 is a graph showing the relationship between nitrogen partial pressure and porosity in porous iron materials obtained when pure iron (99.99%) is melted and cast under pressurization with a nitrogen-argon mixed gas with different partial pressures under constant total pressure of 2.1 MPa.

Paragraph beginning at line 12 of page 5 has been amended as follows:

Fig. 7 is a graph showing the relationship between nitrogen partial pressure and nitrogen content in porous iron materials obtained when pure iron (99.99%) is melted and cast under pressurization with a nitrogen-argon mixed gas with different partial pressures under constant total pressure of 2.1 MPa.

Paragraph beginning at line 7 of page 6 has been amended as follows:

Fig~~s~~. 14 (a) to Fig. 14 (h) are partially cut-away oblique views of porous metal materials in various forms which can be manufactured by the method of the present invention.

Paragraph beginning at line 14 of page 6 has been amended as follows:

Fig. 16 (a) to Fig. 16 (d) ~~shows~~are electronically processed images (corresponding to optical micrographs) showing the pore distribution state of four different porous copper materials obtained by melting at 1250°C under pressurization of 0.8 MPa with hydrogen-argon mixed gas.

Paragraph beginning at line 23 of page 6 has been amended as follows:

Fig. 18 is a graph showing the relationship between partial gas pressure ratio and porosity of the porous ~~ordinary steel~~iron materials obtained by melting at 1650°C under pressurization of 1.5 MPa or 2.0 MPa with nitrogen-helium mixed gas.

Paragraph beginning at line 2 of page 7 has been amended as follows:

Fig. 19 (a) to Fig. 19 (d) ~~is~~are electronically processed images (corresponding to optical micrographs) illustrating the pore distribution state of four different porous ordinary steel materials obtained by melting at 1650°C under pressurization with four different nitrogen-helium mixed gases with various partial gas pressure ratios.

Paragraph beginning at line 7 of page 25 has been amended as follows:

Fig~~s~~. 14 (a) to Fig. 14 (h) are schematic oblique views, with partial cut-aways, of the porous metal body manufactured by the method of the present invention by continuous casting process. For example, the porous metal body shown in Fig. 14 (a) is a cylindrical metal body having a cross section corresponding to C_3 in Fig. 2, and can be manufactured when the liquid phase/solid phase interface in the metal is moved at a constant movement rate along the transverse cross section of the cylinder from one end to the other. The cylindrical porous metal body shown in Fig. 14 (b) is a cylindrical metal body having a cross section corresponding to C_3 in Fig. 2, and can be manufactured when the movement rate of the liquid phase/solid phase interface in the metal is changed intermittently along the transverse cross section of the cylinder from one end to the other. The cylindrical porous metal body shown in Fig. 14 (c) is a cylindrical metal body having a cross section corresponding to C_3 in Fig. 2, and can be manufactured when the gas pressure is changed intermittently while the movement rate of the liquid phase/solid phase interface in the metal is constant along the transverse cross section of the cylinder from one end to the other. The cylindrical porous metal body shown in Fig. 14 (d) is a cylindrical metal body having a cross section corresponding to C_3 in Fig. 2, and can be manufactured when the gas pressure and the movement rate of the liquid phase/solid phase interface in the metal along the transverse cross section of the cylinder from one end to the other are changed intermittently. As shown in Fig. 10, the cylindrical porous metal body shown in Fig. 14 (e) can be manufactured when the cooling mechanism 6 is located in the center of the mold

and the liquid phase/solid phase interface in the metal is moved in the transverse cross sectional direction from the center of the cylinder toward the peripheral portion. The cylindrical porous metal body shown in Fig. 14 (f) can be manufactured when the cooling mechanism is located around the peripheral portion of the cylindrical mold and the liquid phase/solid phase interface in the metal is moved at a constant rate in the transverse cross sectional direction from the peripheral portion toward the center of the cylinder. In this case, a ring portion in which no pores are present can be formed around the periphery by performing the initial cooling rapidly. The cylindrical porous metal body shown in Fig. 14 (g) can be manufactured by the procedure shown in Fig. 11. The porous metal body shown in Fig. 14 (h), which has a rectangular cross section, can be manufactured by the procedure shown in Fig. 11 with using a mold having a rectangular inner surface.

Paragraph beginning at line 17 of page 30 has been amended as follows:

Figs. 16 (a) to Fig. 16 (d) are electronically processed images (corresponding to optical micrographs) showing a portion of the transverse cross section each of the above-mentioned four different porous copper cylinders (a) to (d). These show that the pore size can be varied by adjusting the argon/hydrogen partial pressure ratio.

Paragraph beginning at line 5 of page 32 has been amended as follows:

Figs. 19 (a) to Fig. 19 (d) are electronically processed images (corresponding to optical micrographs) showing a portion of the transverse cross section each of the above-mentioned four different porous iron cylinders (a) to (d). These show that the pore size can be varied by adjusting the argon/hydrogen partial pressure ratio.

Paragraph beginning at line 15 of page 34 has been amended as follows:

More specifically, the copper raw material (99.99% purity) was maintained for 0.1 hour at 1250°C and 5×10^{-2} Torr, and then melted for 0.5 hour at 1250°C under a pressurizing gas atmosphere ~~under a pressurizing gas atmosphere~~ (0.3 MPa H_2 + 0.2 MPa Ar). Then, under the same pressurization conditions, the molten copper having the gas as dissolved therein was poured into a cylindrical mold and cooled from the bottom so that it solidified toward the cylindrical

mold direction, yielding a porous copper column. This column was then converted with a wire cutter to obtain a porous copper cylinder with the shape shown in Fig. 24 and having an outside diameter of 22 mm and a thickness of 1 mm.

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Fig. 4

Nitrogen solubility in iron

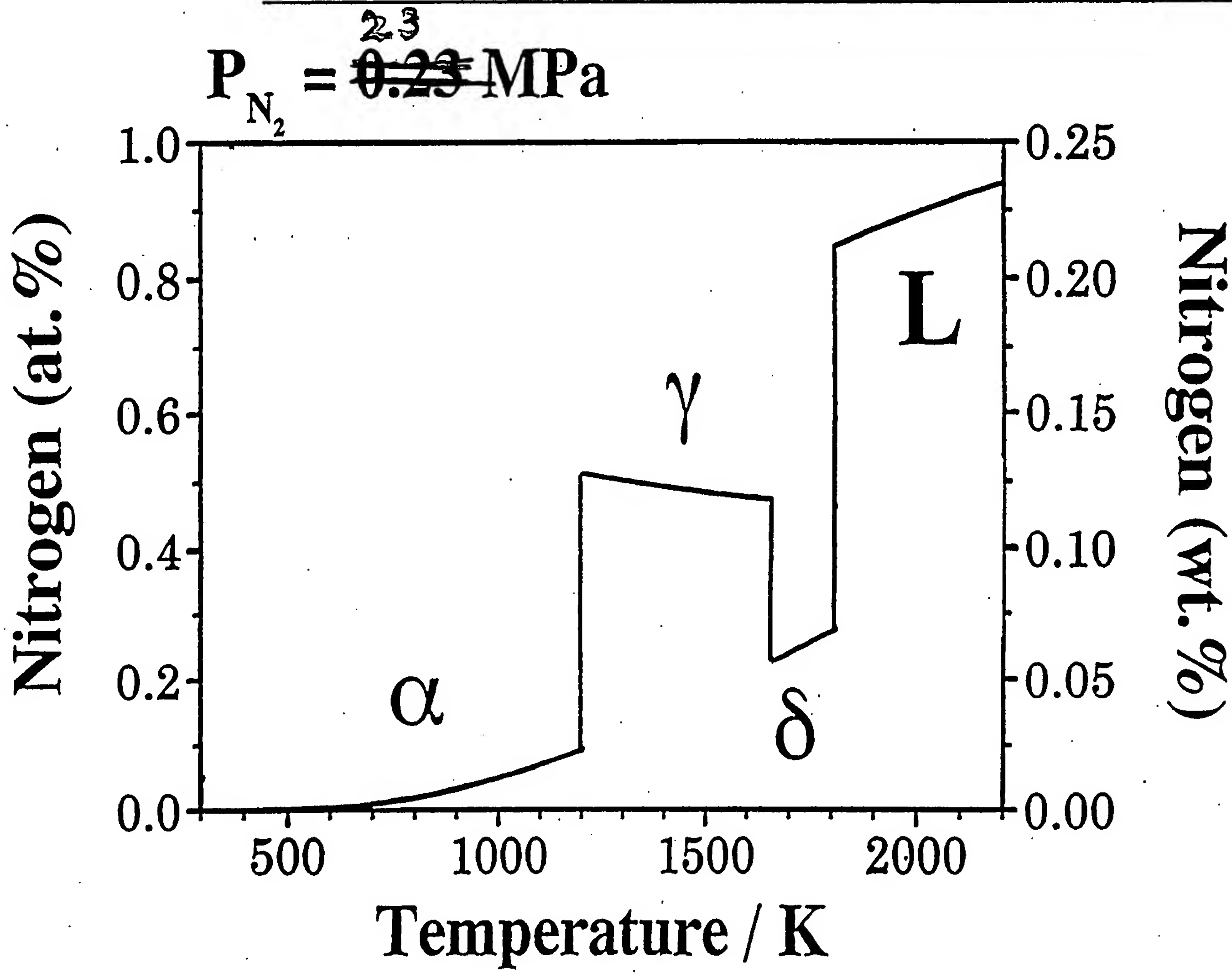


Fig. 6

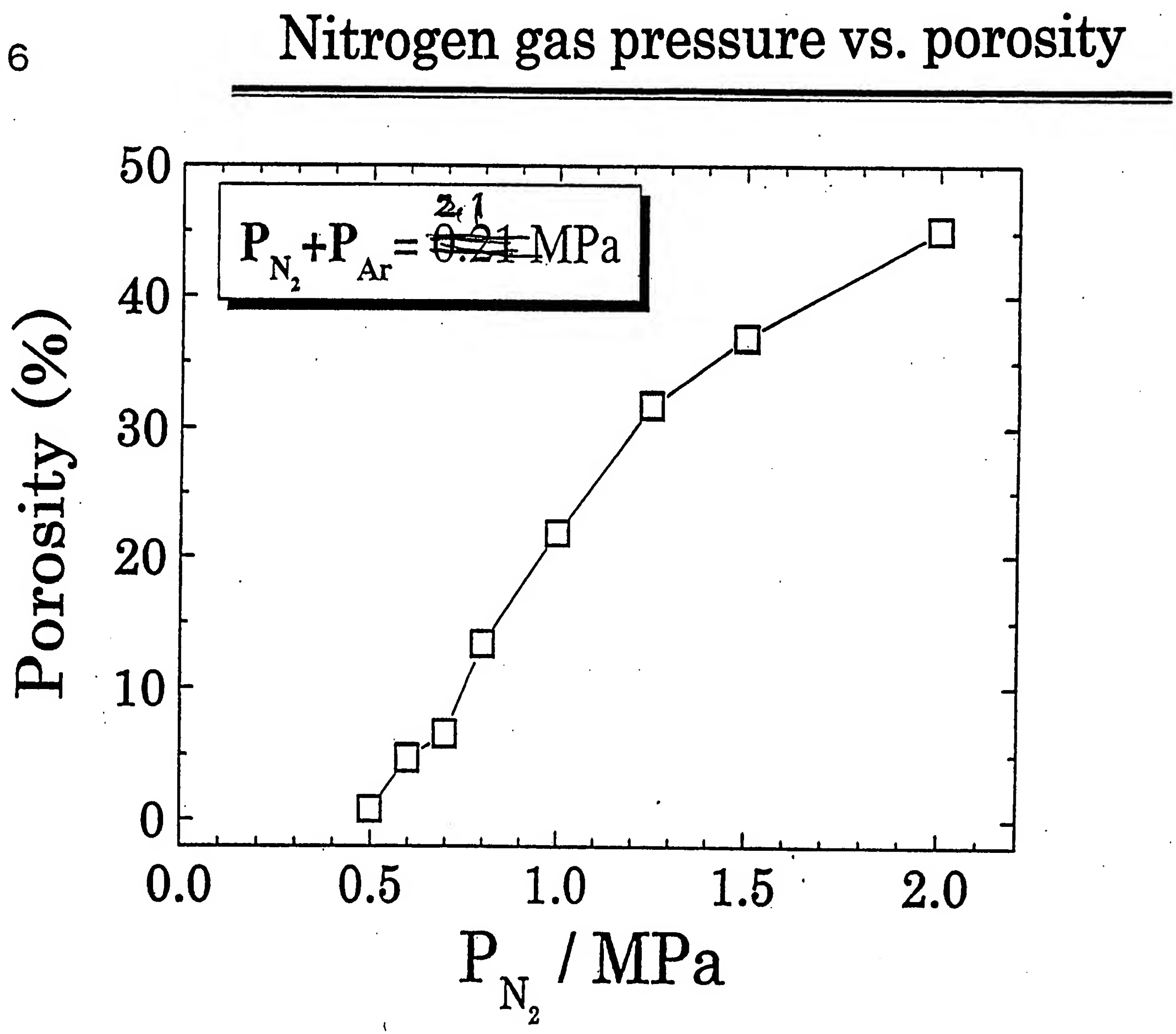
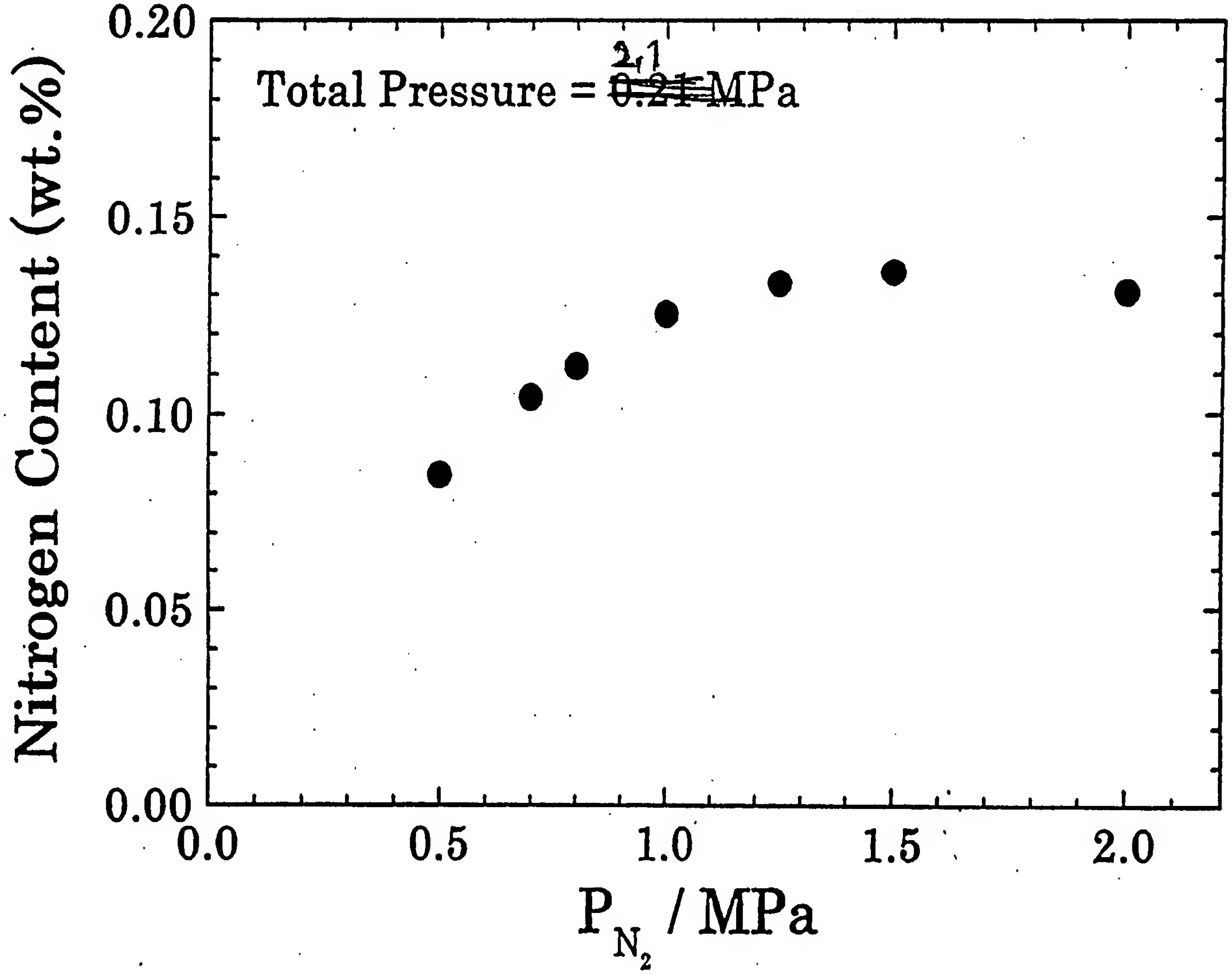
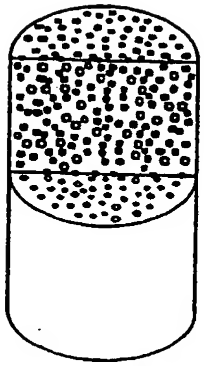

Nitrogen gas pressure vs. porosity
$P_{N_2}+P_{Ar}=\cancel{0.21}$ 2.1 MPa
Porosity (%)
50
40
30
20
10
0
0.0
0.5
1.0
1.5
2.0
P_{N_2} / MPa

Fig. 7

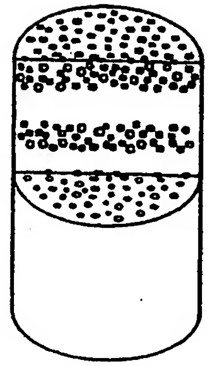
Nitrogen analysis results



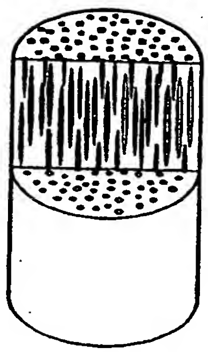
~~Fig. 14~~



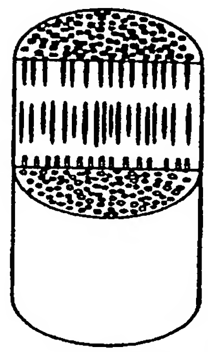
~~(a)~~ Fig. 14 (a)



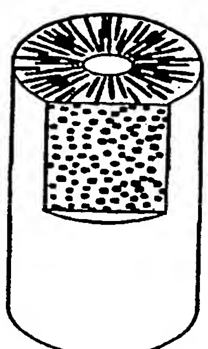
~~(b)~~ Fig. 14 (b)



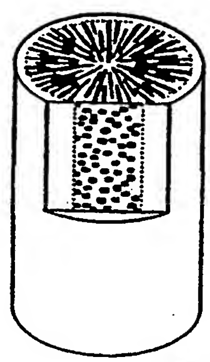
~~(c)~~ Fig. 14 (c)



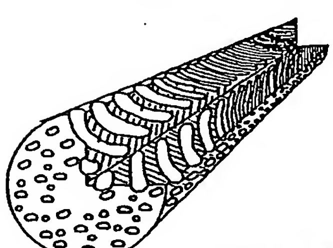
~~(d)~~ Fig. 14 (d)



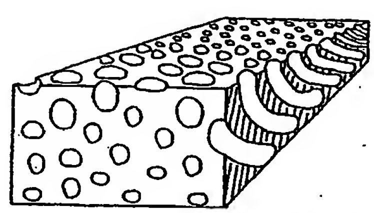
~~(e)~~ Fig. 14 (e)



~~(f)~~ Fig. 14 (f)



~~(g)~~ Fig. 14 (g)



~~(h)~~ Fig. 14 (h)

~~FIG. 16~~

Fig. 16(a)

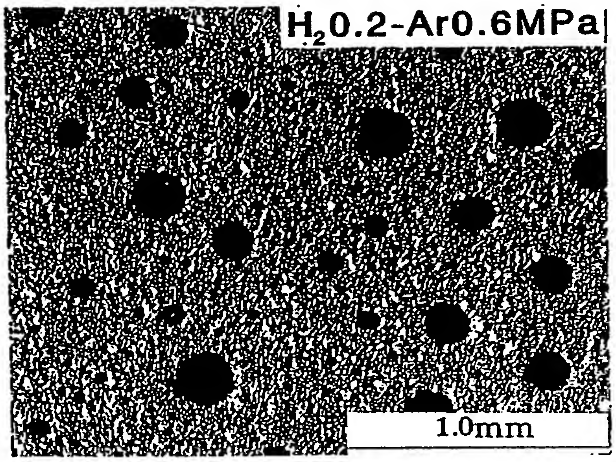
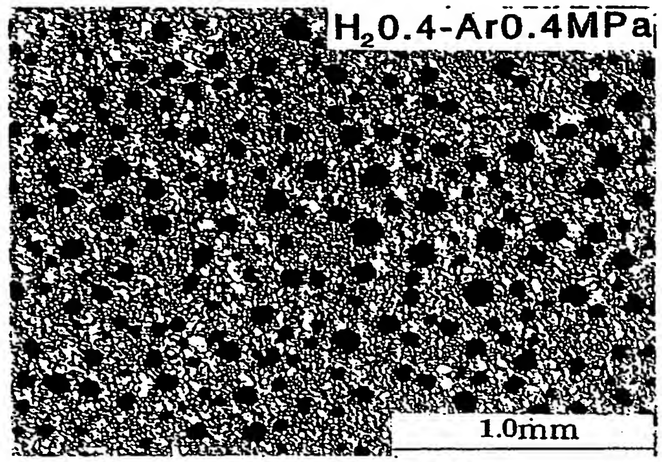


Fig. 16(b)



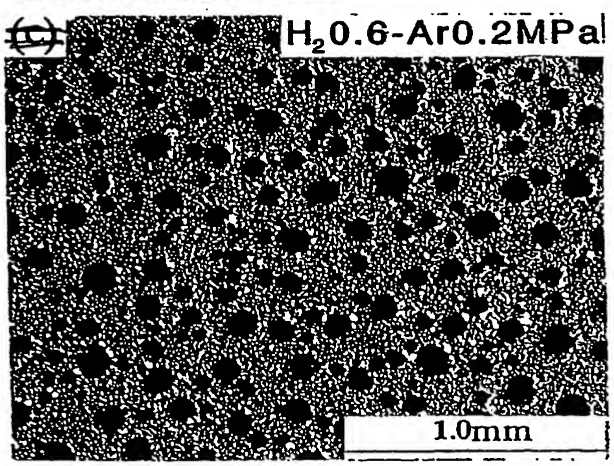


Fig. 16(c)

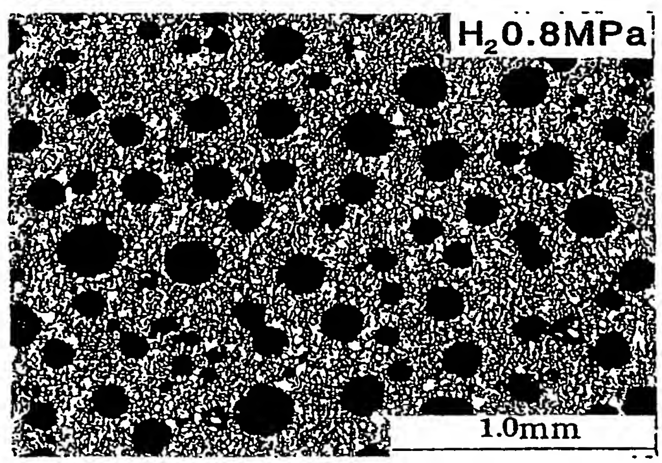


Fig. 16(d)

~~FIG. 19~~

Fig. 19 (a) Fig. 19 (b)

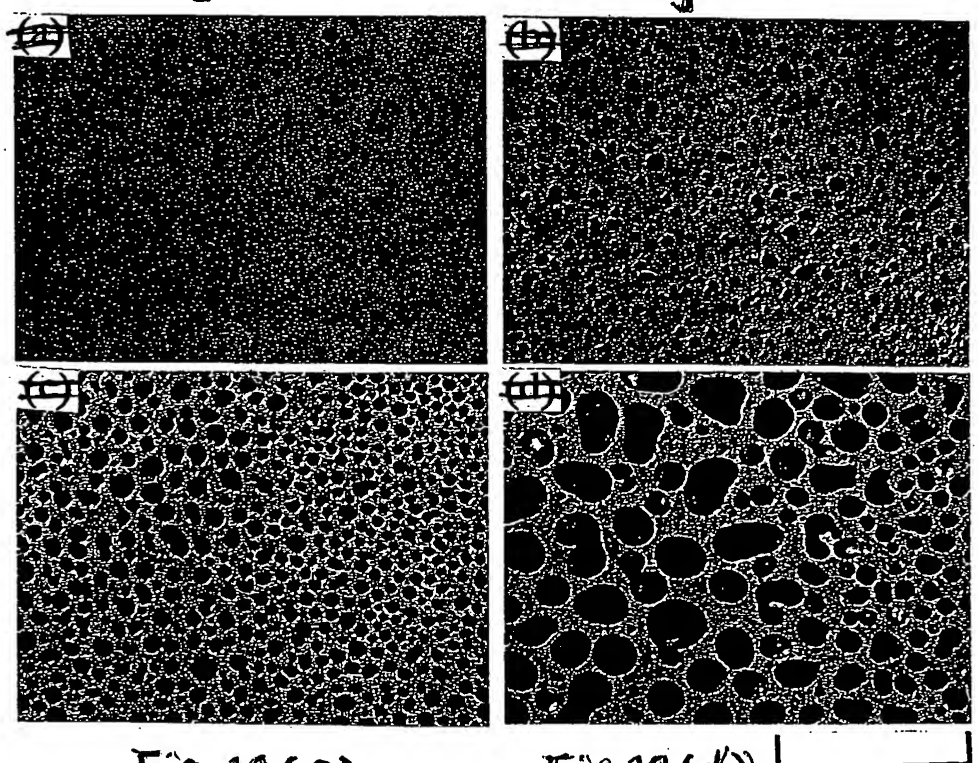


Fig. 19 (c) Fig. 19 (d)